

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference I 0094-PCT	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/EP 00/ 02210	International filing date (day/month/year) 09/03/2000	(Earliest) Priority Date (day/month/year) 29/03/1999
Applicant ABB T&D TECHNOLOGIES LTD.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of Invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

1
☐ None of the figures.

PATENT COOPERATION TREATY

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NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
US Department of Commerce
United States Patent and Trademark
Office, PCT
2011 South Clark Place Room
CP2/5C24
Arlington, VA 22202
ETATS-UNIS D'AMERIQUE
in its capacity as elected Office

Date of mailing (day/month/year) 02 November 2000 (02.11.00)	Applicant's or agent's file reference I 0094-PCT
International application No. PCT/EP00/02210	Priority date (day/month/year) 29 March 1999 (29.03.99)
International filing date (day/month/year) 09 March 2000 (09.03.00)	Applicant CALABRO', Stefano et al

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

18 October 2000 (18.10.00)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer F. Baechler Telephone No.: (41-22) 338.83.38
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PATENT COOPERATION TREATY

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REC'D 19 JUN 2001

WIPO PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference I 0094-PCT	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP00/02210	International filing date (day/month/year) 09/03/2000	Priority date (day/month/year) 29/03/1999
International Patent Classification (IPC) or national classification and IPC H01F27/33		
Applicant ABB T&D TECHNOLOGIES LTD.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 4 sheets, including this cover sheet.

- ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 18/10/2000	Date of completion of this report 15.06.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized officer Vanhulle, R Telephone No. +31 70 340 2515 

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP00/02210

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):
Description, pages:

1-7 as originally filed

Claims, No.:

1-11 as received on 06/02/2001 with letter of 06/02/2001

Drawings, sheets:

1/3-3/3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP00/02210

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-11
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-11
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-11
	No:	Claims	

2. Citations and explanations
see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/EP00/02210

Item V,2:

1. US-A-5 726 617 (Document D1) describes an electric transformer according to the preamble of claim 1, a method for reducing pressure waves according to the preamble of claim 10, and an active device according to the preamble of claim 11.

The problem to be solved consists of providing low-cost and effective active means for generating compensation pressure waves (pressure waves equal in amplitude and opposite in phase to the noise pressure waves generated by the core and winding subassembly).

This problem is solved by the features in the characterising parts of claims 1,10,11.

Although US-A-5 333 455 (Document D2) seems to comprise the characterising features of claims 1,10,11, there is nothing which suggests the combination of documents D1 and D2:

- it would have been difficult for the skilled person to combine the teachings disclosed in D1 and D2 since they refer to technical fields quite far from each other
- the proposed technical problem would not be solved by combining the teachings disclosed in D1 and D2 since the teaching of D2 is not directed to a compensation of the noise pressure waves as stated in the problem to be solved.

Therefore, the solution proposed in claims 1,10,11 is new and there is no hint in the prior art which allows a skilled person to come to this solution in an obvious way.

2. Claims 2-9 are truly dependent claims which relate to further constructive details of the subject-matter of claim 1, and therefore they also fulfil the requirements of Articles 33(2) and (3) PCT.

CLAIMS

1. An electrical transformer comprising:
 - a tank containing transformer fluid;
 - 5 -a transformer core and winding subassembly disposed in said transformer fluid within and spaced apart from said tank;
 - active means for varying the volume of said transformer fluid in order to reduce pressure waves generated by the vibration of said core and winding subassembly during electromagnetic operation, said active means being
 - 10 disposed in said transformer fluid within said tank;
 - characterised in that said active means comprise at least a cell having:
 - a main body and a corrugated membrane operatively connected to said main body in order to realise a sealed container able to maintain a low pressure atmosphere inside;
 - 15 -actuating means placed inside said sealed container and solidly connected to said corrugated membrane.
2. An electrical transformer as in claim 1 characterised in that it comprises elastic means placed inside said cell, operatively connecting said corrugated membrane and said main body.
- 20 3. An electrical transformer as in claim 1 or 2 characterised in that said actuating means comprise one or more piezoelectric stack elements.
4. An electrical transformer as in one or more of the previous claims characterised in that said actuating means are connected to controlling means placed outside said tank.
- 25 5. An electrical transformer as in claim 4 characterised in that said controlling means are connected to detection means for detecting pressure waves generated by the vibration of said core and winding subassembly during electromagnetic operation and transmitting a signal indicative of the amplitude and frequency of said pressure waves to said controlling means.

6. An electrical transformer as in claim 5 characterised in that said detection means are placed inside the tank of said transformer.
7. An electrical transformer as in claim 5 characterised in that said detection means are placed outside the tank of said transformer.
- 5 8. An electrical transformer as in claims 7 characterised in that said detection means comprise one or more transducers for detecting the vibrations of said tank generated by said pressure waves.
9. An electrical transformer as in claim 6 characterised in that said detection means comprise one or more pressure transducers.
- 10 10. Method for reducing pressure waves generated by the vibration of said core and winding subassembly during electromagnetic operation of an electrical transformer as in one or more of the previous claims, characterised in that it comprises the following steps:
 - detecting pressure waves generated by the vibration of said core and winding subassembly of said electrical transformer during electromagnetic operation;
 - 15 -transmitting signals, indicative of amplitude and frequency of said pressure waves, to said controlling means;
 - analysing the signal transmitted by said detection means and transmitting signals for driving said actuating means comprised in each said cells;
 - 20 -generating, through the vibration of the corrugated membrane of each of said cells, transformer fluid pressure waves, varying in amplitude and frequency, able to regulate the volume of said transformer fluid.
11. An active device, for regulating the volume of a fluid in which said device is disposed, through the generation of fluid pressure waves varying in amplitude and frequency, characterised in that it comprises:
 - 25 -a main body and a corrugated membrane operatively connected to said main body in order to realise a sealed container able to maintain a low pressure atmosphere inside;

-actuating means placed inside said sealed container and solidly connected to said corrugated membrane.

REPLACED BY
ART 34 AMDT

PATENT COOPERATION TREATY

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NOTIFICATION CONCERNING
SUBMISSION OR TRANSMITTAL
OF PRIORITY DOCUMENT

(PCT Administrative Instructions, Section 411)

From the INTERNATIONAL BUREAU

To:

GIAVARINI, Francesco
Abb Ricerca S.p.A.
Viale Edison, 50
I-20099 Sesto San Giovanni
ITALIE

Date of mailing (day/month/year) 14 June 2000 (14.06.00)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference I 0094-PCT	
International application No. PCT/EP00/02210	
International publication date (day/month/year) Not yet published	
International filing date (day/month/year) 09 March 2000 (09.03.00)	Priority date (day/month/year) 29 March 1999 (29.03.99)
Applicant ABB T&D TECHNOLOGIES LTD. et al	

1. The applicant is hereby notified of the date of receipt (except where the letters "NR" appear in the right-hand column) by the International Bureau of the priority document(s) relating to the earlier application(s) indicated below. Unless otherwise indicated by an asterisk appearing next to a date of receipt, or by the letters "NR", in the right-hand column, the priority document concerned was submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b).
2. This updates and replaces any previously issued notification concerning submission or transmittal of priority documents.
3. An asterisk(*) appearing next to a date of receipt, in the right-hand column, denotes a priority document submitted or transmitted to the International Bureau but not in compliance with Rule 17.1(a) or (b). In such a case, **the attention of the applicant is directed** to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.
4. The letters "NR" appearing in the right-hand column denote a priority document which was not received by the International Bureau or which the applicant did not request the receiving Office to prepare and transmit to the International Bureau, as provided by Rule 17.1(a) or (b), respectively. In such a case, **the attention of the applicant is directed** to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.

<u>Priority date</u>	<u>Priority application No.</u>	<u>Country or regional Office or PCT receiving Office</u>	<u>Date of receipt of priority document</u>
29 Marc 1999 (29.03.99)	99200953.0	EP	10 May 2000 (10.05.00)

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. (41-22) 740.14.35	Authorized officer Tessadel PAMPLIEGA <i>tdp</i> Telephone No. (41-22) 338.83.38
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